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Plant Community Composition and Structure Monitoring for Scotts Bluff National Monument, 2017 Data Report

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Natural Resource Stewardship and Science

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2017 Data Report

Natural Resource Data Series NPS/NGPN/NRDS—2018/1149

ON THE COVER

Plant Community Composition and Structure Monitoring plot PCM-0002 at Scotts Bluff National Monument, May 2017. Photograph courtesy of the National Park Service.

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Abstract

This report presents the results of vegetation monitoring efforts in 2017 at Scotts Bluff National Monument (SCBL) by the Northern Great Plains Inventory and Monitoring Network (NGPN) and Northern Great Plains Fire Ecology Program (NGPFire).

During the seventh full year of field work, crew members from NGPN visited eight long-term monitoring plots on May 22-25, 2017 to collect data on the plant communities at SCBL. This is part of a long-term monitoring effort to better understand the condition of the vegetation at SCBL. NGPN staff captured data relating to species richness, herb-layer height, abundance of individual native and non-native species, ground cover, and site disturbance on each of the eight plots. In plots where woody species were present, tree regeneration, tall shrub and tree density, and woody fuel load were measured. In addition, crew members from NGPFire visited eight sites (four FPCM and four PCM) on June 5-6, 2017.

Our 2017 findings can be summarized as follows: The NGPN monitoring crews identified 89 plant species in sixteen monitoring plots visited in 2017 at SCBL, of which 14 were exotic species. Four trees were observed across two of the sixteen plots. One of the two plots with measurable trees also had notable tree regeneration. However, woody fuel loads were not observed at any plots. The most common disturbances we observed were the small mammal use, South Bluff Rx fire and grazing.

Acknowledgments

We thank the authors of the NGPN Plant Community Monitoring Protocol, particularly A. Symstad, for outstanding guidance on data collection and reporting. Thank you to the staff at SCBL, particularly R. Manasek, for providing logistical support and safety checks, and Marina McCreary, for her assistance in the field. The 2017 NGPN vegetation field crew of I. Ashton, M. Davis, W. Vogel, L. Lafleur, S. Rockwood, and R. Manuel collected all the data included in this report.

Introduction

Scotts Bluff National Monument (SCBL) was established in 1919 to protect and preserve two iconic bluffs and the associated heritage of western expansion. It covers 3,003 acres and is dominated by mixed-grass prairie with smaller areas of juniper woodlands, badlands, and riparian forests. Vegetation monitoring began at SCBL in 1997 by the Heartland Inventory & Monitoring Program (James 2010) and the Northern Great Plains Fire Ecology Program (NGPFire; Wienk et al. 2011). In 2010, SCBL was incorporated into the Northern Great Plains Inventory & Monitoring Network (NGPN). At that time, vegetation monitoring protocols and plot locations were shifted to better represent the entire park and to coordinate efforts with NGPFire (Symstad et al. 2012b). A total of 34 plots were established by NGPFire and NGPN in SCBL and the combined sampling efforts began in 2011 (Ashton and Davis, 2016). In 2014, an additional 20 plots were established in the riparian forest to assess forest condition. In this report, we provide summaries of the data collected in 2017 by NGPN at eight upland plots.

Methods

The NGPN Plant Community Composition and Structure Monitoring Protocol (Symstad et al. 2012b, a) describes in detail the methods used for sampling long-term plots. Below, we briefly describe the general approach. For those interested in more detail, please see the protocol publications cited above, and available at http://science.nature.nps.gov/im/units/ngpn/monitor/plants.cfm.

NGPN Monitoring Plots 2017

The NGPN team implemented a survey to monitor plant community structure and composition in SCBL using a spatially balanced probability design (Generalized Random Tessellation Stratified [GRTS]; Stevens and Olsen 2003, 2004). Using the GRTS design, 20 randomly located sites were selected within SCBL to become Plant Community Monitoring plots (PCM plots; Figure 1). These 20 sites were split into five panels containing four sites each. The NGPN visits eight PCM plots (two panels) every year using a rotating sampling scheme where four sites were visited in the previous year and four sites were most recently visited four years previously. In a full five-year rotation, each plot will have been visited twice. In 2017, the NGPN crew visited eight upland PCM plots in panel 1 and panel 2 during the week of May 22 – 25 (Table 1). The NGPFire crew visited four PCM plots and four FPCM plots the week of June 5 – 7.

Table 1. Field journal for plant community monitoring in Scotts Bluff National Monument (SCBL) for the 2017 season. Plant community monitoring was completed using a crew of four people on May 22 & 23. SCBL park employee Marina McCreary assisted on May 23 & 24 for a total of 6.5 hours. On the morning of May 24, 2017, two additional NGPN crew members assisted with plots before returning to Rapid City. An NGPFire crew of four completed eight plots between June 5 & 7 with the assistance of SCBL park employee Dyer Frank on June 6th.

Date	Approximate Travel Time (hrs)	Housing	Plots Read	Plot Notes (number of crew, hours to complete plot, and plot notes)
Monday, May 22, 2017	4	Monument Inn Gering, NE	PCM_0022 PCM_0006	crew of 4; 2.5 hrs crew of 4; 2 hrs; prairie dog town, lots of *Bromus tectorum*
Tuesday, May 23, 2017	N/A	Monument Inn Gering, NE	PCM_0007 PCM_0023 PCM_0005	crew of 4; 2 hrs; +Marina McCreary crew of 4; 3 hrs; +Marina McCreary; 1 new tree added to map & new slopes taken crew of 4; 1.5 hrs; finished everything except B - line
Wednesday, May 24, 2017	N/A	Monument Inn Gering, NE	PCM_0004 PCM_0005 PCM_0021 PCM_0002	crew of 2; 3 hrs; +Marina McCreary crew of 2; 1.5 hrs; finished plot crew of 4; 3 hrs; +1.5 hr RT hike crew of 6; 3 hrs; tagged 1 tree, new tree map made, new directions to plot
Thursday, May 25th, 2017	4	N/A	N/A	Crew of 6 returned to Rapid City
Monday, June 5th, 2017	3	Monument Inn Gering, NE	PCM_0020 PCM_0024	NGPFire crew of 4 for both plots
Tuesday, June 6th, 2017	N/A	Monument Inn Gering, NE	FPCM_0097 FPCM_0130 FPCM_0165 FPCM_0221 PCM_0018	NGPFire crew of 4 + Dyer Frank for all 5 plots
Wednesday, June 7th, 2017	3	N/A	PCM_0013	NGPFire crew of 4

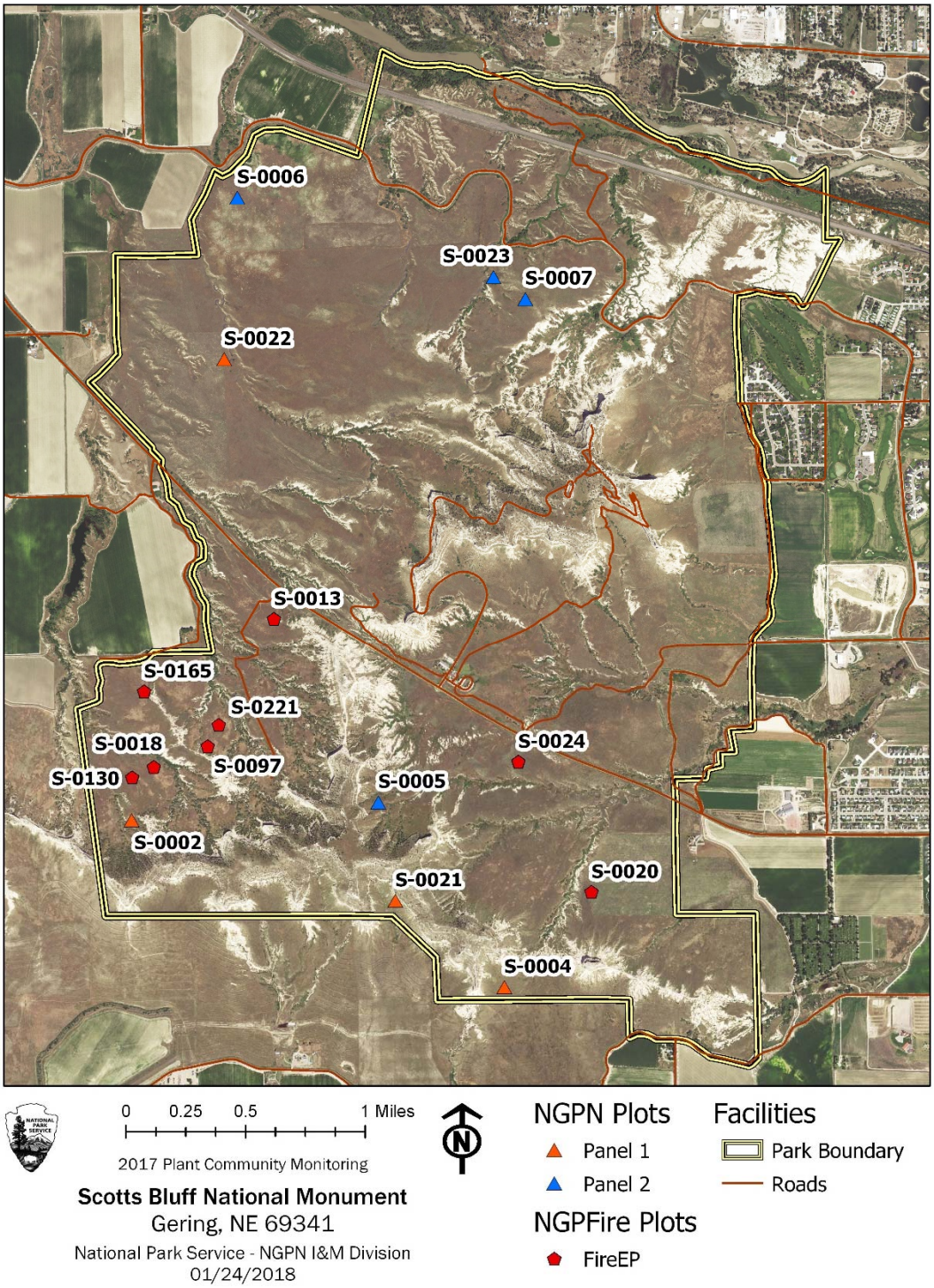

Figure 1. Map of Scotts Bluff National Monument plant community monitoring plots visited in 2017. Four Panel 1 plots (orange triangles), and four Panel 2 plots (blue triangles) were monitored in 2017 by NGPN. Eight additional plots were monitored by NGPFire (red pentagons).

Plot Layout and Sampling

At each of the sites visited, the NGPN crew recorded plant species cover and frequency in a rectangular, 50 m x 20 m (0.1 ha), permanent plot (Figure 2). Data on ground cover, herb-layer height ≤ 2 m, and plant cover were collected along two 50 m transects (the long sides of the plot) using a point-intercept method (Figure 3). At 50 locations along each transect, once every 1 meter, a pole was dropped to the ground and all species that touched the pole were recorded, along with ground cover and canopy height. Species richness data from the point-intercept method were supplemented with species presence data collected in five 1 m^2 quadrats located systematically along each transect (Figure 2). When woody species were also present, tree regeneration and tall shrub density data were collected within a 10 m radius subplot centered in the larger 50 m x 20 m plot (Figure 2). Trees within the 0.1 ha plot with a diameter at breast height (DBH) of > 15 cm were mapped and tagged. For each tree, the species, DBH, status (live or dead), and condition (e.g., leaf-discoloration, insect-damaged) were recorded. Dead and downed woody fuel load data were also collected at these forested plots along two perpendicular, 100 foot (30.49 m) transects with midpoints at the center of the plot (Figure 2), following Brown's Line methods (Brown 1974, Brown et al. 1982).

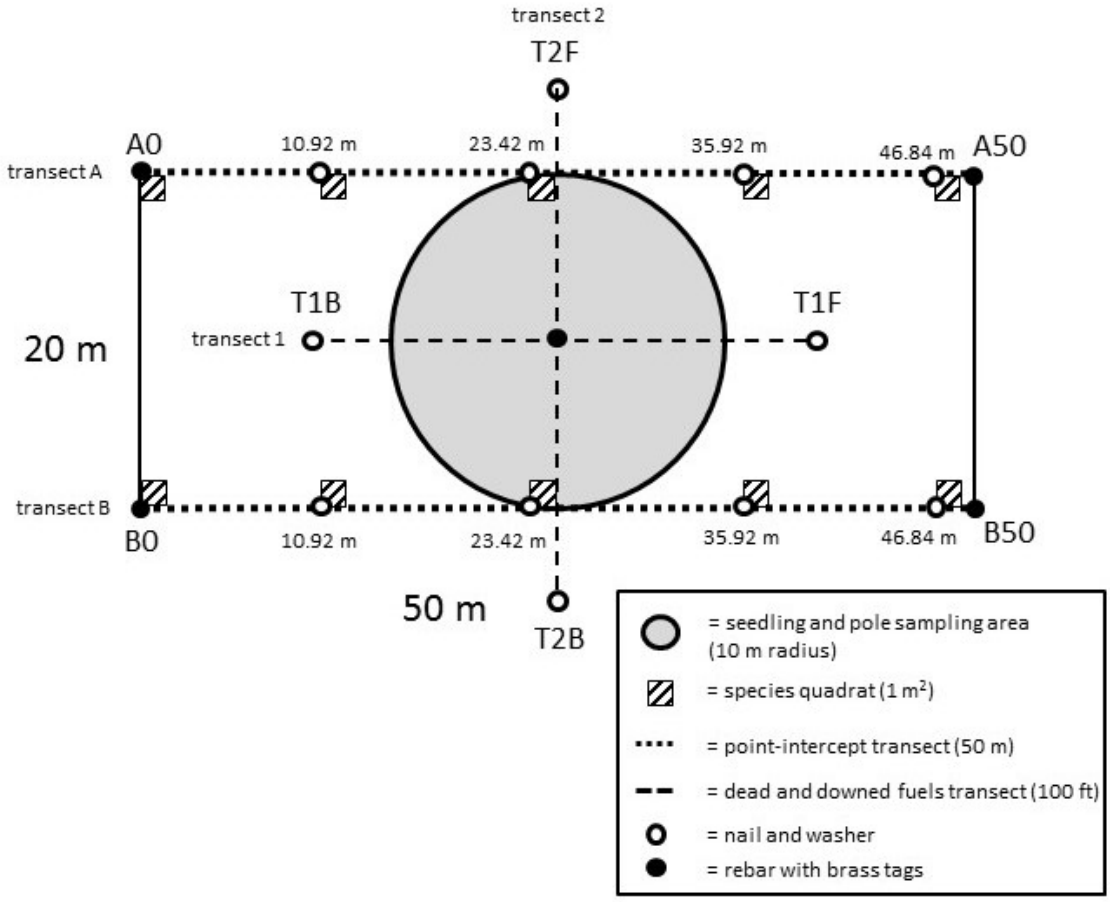

Figure 2. Long-term monitoring plot layout used for sampling vegetation in Scotts Bluff National Monument.

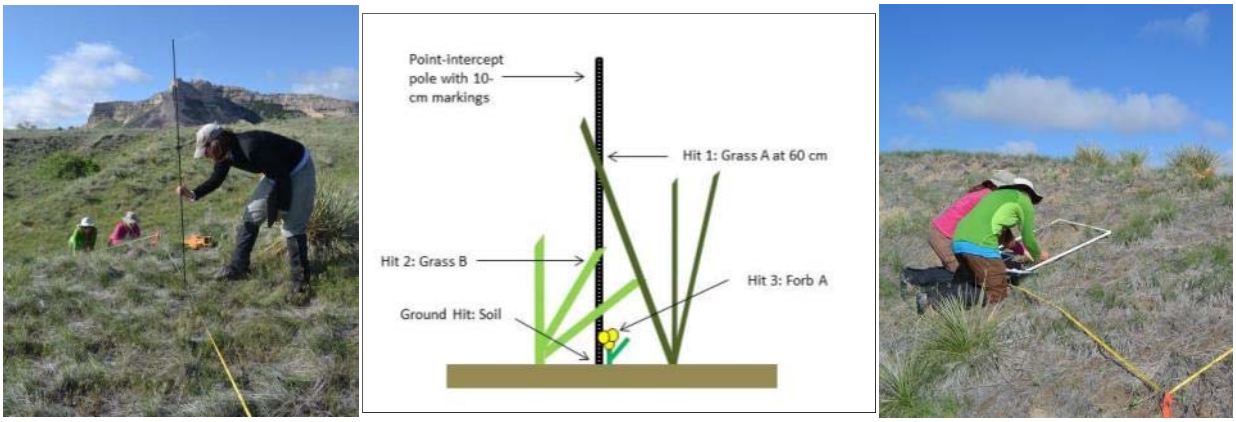

Figure 3. The Northern Great Plains Inventory & Monitoring vegetation crew used point-intercept (left and center panel) and 1m^2 quadrats (right panel) to document plant diversity and abundance.

At each of the plots visited, common disturbances and target early detection exotic species were also assessed and documented. Common disturbances include such things as prairie dog towns, animal trails, and fire occurrence. For all plots, the type, severity, and approximate area (m^2) of the disturbances were recorded. Early detection exotic species have the potential to spread into the park and cause significant ecological impacts were chosen in collaboration with the Midwest Invasive Plant Network, the Exotic Plant Management Team, park managers, and local weed experts (Table 2). For each early detection exotic species present, an abundance class was given on a scale from 1 – 5 where 1 = one individual, 2 = few individuals, 3 = cover of 1 – 5%, 4 = cover of 5 – 25%, and 5 = cover > 25% of the plot. The information gathered from this procedure is critical for early detection and rapid response to such threats.

Table 2. Exotic species surveyed for at Scotts Bluff National Monument as part of the early detection and rapid response program within the Northern Great Plains Network.

Scientific Name	Common Name	Habitat
Alliaria petiolata	garlic mustard	Riparian
Polygonum cuspidatum; P. sachalinense; P. x bohemicum	knotweeds	Riparian
Pueraria montana var. lobata	kudzu	Riparian
Iris pseudacorus	yellow iris	Riparian
Ailanthus altissima	tree of heaven	Riparian
Lepidium latifolium	perennial pepperweed	Riparian
Arundo donax	giant reed	Riparian
Rhamnus cathartica	common buckthorn	Riparian
Heracleum mantegazzianum	giant hogweed	Riparian
Centaurea solstitialis	yellow star thistle	Upland
Hieracium aurantiacum; H. caespitosum	orange and meadow hawkweed	Upland
Isatis tinctoria	Dyer's woad	Upland

Table 2 (continued). Exotic species surveyed for at Scotts Bluff National Monument as part of the early detection and rapid response program within the Northern Great Plains Network.

Scientific Name	Common Name	Habitat
Chondrilla juncea	rush skeletonweed	Upland
Gypsophila paniculata	baby's breath	Upland
Centaurea virgata; C.diffusa	knapweeds	Upland
Linaria dalmatica; L. vulgaris	toadflax	Upland
Euphorbia myrsinites & E. cyparissias	myrtle spurge	Upland
Dipsacus fullonum & D. laciniatus	common teasel	Upland
Salvia aethiopis	Mediterranean sage	Upland
Ventenata dubia	African wiregrass	Upland
Taeniatherum caput-medusae	medusahead	Upland

The conservation status ranks of plant species in Nebraska is determined by the Nebraska Natural Heritage Program (NENHP). For the purpose of this report, a species was considered rare if its conservation status rank was S1, S2, or S3. See Table 3 for a detailed definition of each conservation status rank.

Table 3. Definitions of state and global species conservation status ranks*.

Status Rank	Category	Definition
S1/G1	Critically imperiled	Due to extreme rarity (5 or fewer occurrences) or other factor(s) making it especially vulnerable to extirpation.
S2/G2	Imperiled	Due to rarity resulting from a very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation.
S3/G3	Vulnerable	Due to a restricted range, relatively few populations (often 80 or fewer), recent widespread declines, or other factors making it vulnerable to extirpation.
S4/G4	Apparently secure	Uncommon but not rare; some cause for concern due to declines or other factors.
S5/G5	Secure	Common, widespread and abundant.
S#S#/ G#G#	Range rank (e.g. S2S3)	Used to indicate uncertainty about the status of the species or community. Ranges cannot skip more than one rank.

* Adapted from NatureServe status assessment table (http://www.natureserve.org/conservation-tools/conservation-status-assessment)

Data Management and Analysis

The FFI database (FEAT/FIREMON Integrated; http://frames.gov/ffi/) was used as the primary software environment for managing the sampling data. This database is used by a variety of agencies (e.g., NPS, USDA Forest Service, U.S. Fish and Wildlife Service), has a national-level support system, and generally conforms to the Natural Resource Database Template standards established by the Inventory and Monitoring Program. Species scientific names, codes, and common names are from the USDA Plants Database (USDA-NRCS 2016). Nomenclature follows the Integrated

Taxonomic Information System (ITIS) standards (http://www.itis.gov). In the rare case where ITIS recognized a new name that was not in the USDA Plants database, the new name was used and a unique plant code was assigned. After data for the sites were entered into the FFI database, 100% of database records were verified with the original data sheets to minimize transcription errors, followed by a final 10% check. After all data were entered and verified, automated data checks were used to locate any remaining errors in the data. When errors were identified by the crew or the automated data checks, changes were made to the original datasheets and the FFI database as needed. At the time this data report was completed, any data contributed by NGPFire had only undergone 100% checks.

Results

There are 395 vascular plant species on the SCBL plant species list (https://irma.nps.gov/NPSpecies/Search/SpeciesList/SCBL). The NGPN monitoring crew identified 89 plant species in eight monitoring plots visited in 2017 at SCBL (Table 4). Of these plant species, 14 are exotic species at SCBL. All exotic species were either forbs or graminoids (grasses, sedges, and rushes). Based on species data collected in 2017, PCM_0023, a plot in the northern part of the park, is the most botanically diverse, and PCM_0006, close to the northwest park boundary, is the least diverse plot (Table 5). Plots PCM_0002 and PCM_0007 have the greatest native species absolute cover, and PCM_0006 and PCM_0022 have the greatest exotic species absolute cover (Table 6). No target early detection exotic species were identified (Table 2). All trees, shrubs and subshrubs we observed were native species.

Table 4. A list of all plant species identified in Scotts Bluff National Monument's long-term plant community monitoring plots in 2017. The species are grouped by plant family. In the notes column, "Exotic" indicates the species is not native to the park or, in cases where only the genus was identified, some species in that genus are exotic. Species considered rare in Nebraska are indicated in the notes column with a state conservation ranking (Table 3).

Family	Code	Scientific Name	Common Name	Notes
Agavaceae	YUGL	*Yucca glauca*	soapweed yucca	-
Anacardiaceae	RHTR	*Rhus trilobata*	skunkbush sumac	-
	TORY	*Toxicodendron rydbergii*	western poison ivy	-
Asclepiadaceae	ASSP	*Asclepias speciosa*	showy milkweed	-
Asteraceae	AMPS	*Ambrosia psilostachya*	Cuman ragweed	-
	ARDR4	*Artemisia dracunculus*	tarragon	-
	ARFI2	*Artemisia filifolia*	sand sagebrush	-
	ARFR4	*Artemisia frigida*	prairie sagewort	-
	COCA5	*Conyza canadensis*	Canadian horseweed	-
	GUSA2	*Gutierrezia sarothrae*	broom snakeweed	-
	HELIA3	*Helianthus*	sunflower	-
	HEVI4	*Heterotheca villosa*	hairy false goldenaster	S1
	LASE	*Lactuca serriola*	prickly lettuce	Exotic
	LYJU	*Lygodesmia juncea*	rush skeletonplant	-
	MUOB99	*Mulgedium oblongifolium*	blue lettuce	-
	NOCU	*Nothocalais cuspidata*	sharppoint prairie-dandelion	-
	SERI2	*Senecio riddellii*	Riddell's ragwort	-
	SOMO	*Solidago mollis*	velvety goldenrod	-
	SYMPH4	*Symphyotrichum*	aster	-
	TAOF	*Taraxacum officinale*	common dandelion	Exotic

Table 4 (continued). A list of all plant species identified in Scotts Bluff National Monument's long-term plant community monitoring plots in 2017. The species are grouped by plant family. In the notes column, "Exotic" indicates the species is not native to the park or, in cases where only the genus was identified, some species in that genus are exotic. Species considered rare in Nebraska are indicated in the notes column with a state conservation ranking (Table 3).

Family	Code	Scientific Name	Common Name	Notes
Asteraceae (continued)	THME	*Thelesperma megapotamicum*	Hopi tea greenthread	-
	TRDU	*Tragopogon dubius*	yellow salsify	Exotic
Boraginaceae	LAOC3	*Lappula occidentalis*	flatspine stickseed	-
	LIIN2	*Lithospermum incisum*	narrowleaf stoneseed	-
Brassicaceae	ALDE	*Alyssum desertorum*	desert madwort	Exotic
	DEPI	*Descurainia pinnata*	western tansymustard	S3S5
	DRRE2	*Draba reptans*	Carolina draba	-
	SIAL2	*Sisymbrium altissimum*	tall tumblemustard	Exotic
Cactaceae	OPPO	*Opuntia polyacantha*	plains pricklypear	-
Caprifoliaceae	SYOC	*Symphoricarpos occidentalis*	western snowberry	-
Caryophyllaceae	ERHO13	*Eremogone hookeri*	Hooker's sandwort	S3S5
	PADE4	*Paronychia depressa*	spreading nailwort	-
Chenopodiaceae	CHENO	*Chenopodium*	goosefoot	Exotic
	KRLA2	*Krascheninnikovia lanata*	winterfat	S3S5
	SATR12	*Salsola tragus*	prickly Russian thistle	Exotic
Commelinaceae	TROC	*Tradescantia occidentalis*	prairie spiderwort	-
Cupressaceae	JUSC2	*Juniperus scopulorum*	Rocky Mountain juniper	-
Cyperaceae	CAFI	*Carex filifolia*	threadleaf sedge	-
Euphorbiaceae	CRTE4	*Croton texensis*	Texas croton	-
	EUPHO	*Euphorbia*	spurge	Exotic
Fabaceae	ASGR3	*Astragalus gracilis*	slender milkvetch	-
	ASLA27	*Astragalus laxmannii*	Laxmann's milkvetch	-
	DACA7	*Dalea candida*	white prairie clover	-
	LAPO2	*Lathyrus polymorphus*	manystem pea	-
	MEOF	*Melilotus officinalis*	yellow sweetclover	Exotic
	PEAR6	*Pediomelum argophyllum*	silverleaf Indian breadroot	-
	PSTE5	*Psoralidium tenuiflorum*	slimflower scurfpea	-
	THRH	*Thermopsis rhombifolia*	prairie thermopsis	-
	VIAM	*Vicia americana*	American vetch	S2S4
Grossulariaceae	RIAU	*Ribes aureum*	golden currant	-
Liliaceae	FRAT	*Fritillaria atropurpurea*	spotted fritillary	-
Linaceae	LIRI	*Linum rigidum*	stiffstem flax	-

Table 4 (continued). A list of all plant species identified in Scotts Bluff National Monument's long-term plant community monitoring plots in 2017. The species are grouped by plant family. In the notes column, "Exotic" indicates the species is not native to the park or, in cases where only the genus was identified, some species in that genus are exotic. Species considered rare in Nebraska are indicated in the notes column with a state conservation ranking (Table 3).

Family	Code	Scientific Name	Common Name	Notes
Malvaceae	SPCO	*Sphaeralcea coccinea*	scarlet globemallow	-
Melanthiaceae	TOVE2	*Toxicoscordion venenosum*	meadow deathcamas	-
Nyctaginaceae	MIHI	*Mirabilis hirsuta*	hairy four o'clock	-
	MILI3	*Mirabilis linearis*	narrowleaf four o'clock	-
Onagraceae	OEBI	*Oenothera biennis*	common evening-primrose	-
	OESE3	*Oenothera serrulata*	yellow sundrops	-
	OESU99	*Oenothera suffrutescens*	scarlet beeblossom	-
Poaceae	ACHY	*Achnatherum hymenoides*	Indian ricegrass	-
	AGCR	*Agropyron cristatum*	crested wheatgrass	Exotic
	ANGE	*Andropogon gerardii*	big bluestem	-
	ARPU9	*Aristida purpurea*	purple threeawn	S3S5
	BOCU	*Bouteloua curtipendula*	sideoats grama	-
	BOGR2	*Bouteloua gracilis*	blue grama	-
	BRJA	*Bromus japonicus*	Japanese brome	Exotic
	BRTE	*Bromus tectorum*	cheatgrass	Exotic
	CALO	*Calamovilfa longifolia*	prairie sandreed	-
	ELTR7	*Elymus trachycaulus*	slender wheatgrass	S1
	HECO26	*Hesperostipa comata*	needle and thread	-
	KOMA	*Koeleria macrantha*	prairie Junegrass	-
	PASM	*Pascopyrum smithii*	western wheatgrass	-
	POPR	*Poa pratensis*	Kentucky bluegrass	Exotic
	PSSP6	*Pseudoroegneria spicata*	bluebunch wheatgrass	-
	SCSC	*Schizachyrium scoparium*	little bluestem	-
	SPCR	*Sporobolus cryptandrus*	sand dropseed	-
	VUOC	*Vulpia octoflora*	sixweeks fescue	-
Polemoniaceae	PHAN4	*Phlox andicola*	prairie phlox	-
	PHHO	*Phlox hoodii*	spiny phlox	-
Rosaceae	PRVI	*Prunus virginiana*	chokecherry	-
	ROWO	*Rosa woodsii*	Woods' rose	-
Rubiaceae	GAAP2	*Galium aparine*	stickywilly	-
Scrophulariaceae	PEAL2	*Penstemon albidus*	white penstemon	-
Solanaceae	PHHI8	*Physalis hispida*	prairie groundcherry	-
	PHLO4	*Physalis longifolia*	longleaf groundcherry	-

Table 4 (continued). A list of all plant species identified in Scotts Bluff National Monument's long-term plant community monitoring plots in 2017. The species are grouped by plant family. In the notes column, "Exotic" indicates the species is not native to the park or, in cases where only the genus was identified, some species in that genus are exotic. Species considered rare in Nebraska are indicated in the notes column with a state conservation ranking (Table 3).

Family	Code	Scientific Name	Common Name	Notes
Unknown Family	UNKFORB	*Unknown forb*	unknown forb	Exotic
Urticaceae	PAPE5	*Parietaria pensylvanica*	Pennsylvania pellitory	-
Violaceae	VINU2	*Viola nuttallii*	Nuttall's violet	-
Vitaceae	PAVI5	*Parthenocissus vitacea*	woodbine	-

Table 5. Number of plant species per plot identified in sixteen plots at Scotts Bluff National Monument in 2017.

Plot	Native species	Exotic species	Total species
PCM_0002	15	6	21
PCM_0004	14	7	21
PCM_0005	28	7	35
PCM_0006	7	5	12
PCM_0007	19	7	26
PCM_0021	29	3	32
PCM_0022	13	6	19
PCM_0023	36	8	44
FPCM_0097	11	3	14
FPCM_0130	9	3	12
FPCM_0165	3	3	6
FPCM_0221	6	3	9
PCM_0013	14	4	18
PCM_0018	8	3	11
PCM_0020	8	2	10
PCM_0024	9	3	12

Table 6. Absolute percent cover of native and exotic plant species in plots monitored at Scotts Bluff National Monument in 2017. Absolute percent cover is measured using the point-intercept method which includes overlapping species canopies, resulting in some cover values greater than 100%.

	Absolute Cover (%)	
Plot	Native	Exotic
PCM_0002	136	16
PCM_0004	87	24
PCM_0005	121	25
PCM_0006	40	81
PCM_0007	141	12
PCM_0021	119	0
PCM_0022	52	77
PCM_0023	111	20
FPCM_0097	98	8
FPCM_0130	88	31
FPCM_0165	116	8
FPCM_0221	92	8
PCM_0013	109	21
PCM_0018	102	43
PCM_0020	105	7
PCM_0024	106	4

We identified seven rare plant species in SCBL monitoring plots in 2017. Two of these are critically imperiled (S1): slender wheatgrass (*Elymus trachycaulus*) and hairy false goldenaster (*Heterotheca villosa*). Five other species were ranked either imperiled to apparently secure (S2S4) or vulnerable to secure (S3S5) and are noted in the "Rare" column in Table 3. All rare species observed are classified as secure (G5) at the global scale, but are rare in the state because they exist on the edge of their global range in Nebraska.

There a total of four trees and 75 seedlings were found across two of the sixteen sites visited in 2017 (Table 7). Tree data collected included species name, size class based on diameter at breast height (DBH), status (live or dead), total number of individuals, and density per hectare. DBH categories are tree (DBH>15 cm), pole (2.54 cm≤DBH≤15 cm), and seedling (DBH<2.54 cm). No poles were present at any of the sites visited in 2017.

Table 7. Woody species data was only observed in two of sixteen plots visited at Scotts Bluff National Monument in 2017. Only plots (PCM_0002 and PCM_0023) had any trees, poles, or seedlings present. DBH categories are tree (DBH>15 cm), pole (2.54 cm≤DBH≤15 cm), and seedling (DBH<2.54 cm).

Plot Name	Common Name	DBH	Status	Total Individuals	Density/ha.
SCBL_PCM_0002	Rocky Mountain juniper	Tree	Alive	1	10.00
SCBL_PCM_0023	Rocky Mountain juniper	Tree	Alive	3	30.00
SCBL_PCM_0023	chokecherry	Seedling	Alive	75	2387.01

Dead and downed wood and surface fuels provide foraging habitat and refugia for wildlife, substrate for mosses and fungi, and microhabitats that can encourage plant establishment. When surface fuels are too abundant they can increase the risk of high intensity fires. We surveyed for surface fuels in two plots, PCM_0002 and PCM_0023, but there were no measurable woody fuels found. Surface fuels were not measured at the other six plots because no trees were present.

Disturbances occurred in all eight plant community monitoring plots that were visited at SCBL in 2017 (Table 8). Small mammal use which includes mounds of dirt left by gophers and badgers, was the most common disturbance observed. Other common disturbances included the South Bluff Rx fire, which took place on September 16, 2016, recently grazed vegetation, and animal trails. Prairie dog signs and erosion were also seen.

Table 8. Disturbance type and approximate area observed in 8 plots visited at Scotts Bluff National Monument in 2017. At sites visited by the NGPN for PCM monitoring, the size of the disturbance was approximated estimated in m^2 of a total area of 1000 m^2. On September 16, 2016 NGPFire conducted the South Bluff Rx Fire; for those sites, the size of the disturbance was approximated out of a total area of 1000 m^2 per plot.

Plot	Disturbance Type	Size (m^2)
SCBL_PCM_0002	Animal Trail	5
	Small Mammal	5
	South Bluff Rx Fire	1000
SCBL_PCM_0004	Small Mammal	5
	South Bluff Rx Fire	1000
SCBL_PCM_0005	Small Mammal	5
	South Bluff Rx Fire	1000
SCBL_PCM_0006	Grazing	20
	Prairie Dog	1000
SCBL_PCM_0007	Small Mammal	2
SCBL_PCM_0021	Erosion	3
SCBL_PCM_0022	Animal Trail	20
	Small Mammal	30
SCBL_PCM_0023	Grazing	40

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